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1 RECORD OF ORAL HEARING

2 UNITED STATES PATENT AND TRADEMARK OFFICE

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6 BEFORE THE BOARD OF PATENT APPEALS  
7 AND INTERFERENCES

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10 Ex parte BERNARD M. WERNER

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13 Appeal 2009-003277  
14 Application 10/046,404  
15 Technology Center 2600

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18 Oral Hearing Held: August 12, 2009

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22 Before KENNETH W. HAIRSTON, JOHN C. MARTIN and BRADLEY  
23 W. BAUMEISTER, Administrative Patent Judges

24  
25 ON BEHALF OF THE APPELLANT:

26  
27 ENRIQUE PEREZ, ESQUIRE  
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32  
33 The above-entitled matter came on for hearing on Wednesday, August  
34 12, 2009, commencing at 10:09 a.m., at The U.S. Patent and Trademark  
35 Office, 600 Dulany Street, Alexandria, Virginia, before Ashorethea  
36 Cleveland, Notary Public.

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1 THE USHER: Good morning. Calendar Number 37, Appeal Number  
2 2009-3277. Mr. Perez.

3 JUDGE HAIRSTON: Counselor, use the podium.

4 MR. PEREZ: Good morning. My name is Enrique Perez. I represent  
5 the Applicant in this case; in this case, claims one through eight and eleven  
6 through 28 of US Patent Application Number 10/046,404, entitled,  
7 "Constant Coverage Waveguide."

8 Claims presently stand as rejected as anticipated by Klayman, US  
9 Patent Number 3,930,561, titled, "Low Distortion Pyramidal Dispersion  
10 Speaker."

11 Anticipation requires that a reference teach or disclose each and every  
12 limitation recited in the claims. Klayman does not teach or disclose each  
13 and every limitation, claims one through eight and eleven through 28.

14 Specifically, in rejecting the claims, the Examiner erred by  
15 disregarding features and misinterpreted the meaning of certain terms.

16 Claim one is directed to a constant coverage waveguide. The  
17 waveguide, as like most waveguides, has a throat at the narrow end through  
18 which the sound is delivered and the mouth which is the wide end through  
19 which the sound exits.

20 The portion between the mouth and the throat is the actual waveguide  
21 part that guides the sound waves through the waveguide. It's the shape of  
22 the waveguide that controls the direction of the wave and the dispersion of  
23 the sound.

24 In the recited subject matter, the constant coverage waveguide, claim  
25 one, the waveguide has a continuous, three-dimensional, least-energy  
26 surface coincident with four control curves.

1 JUDGE MARTIN: Mr. Perez, can I interrupt you?

2 MR. PEREZ: Sure.

3 JUDGE MARTIN: I want to know what the least-energy surface is.  
4 How do I know that I have a least-energy surface?

5 MR. PEREZ: Well, in terms of the present claim one, the  
6 least-energy surface is one where there's no discontinuity to the surface.

7 JUDGE HAIRSTON: How do you know when you have arrived at  
8 that though?

9 MR. PEREZ: Well, it's when you have the control curves defining the  
10 surface between the throat and the mouth, are defined by one curve. So, that  
11 makes the surface continuous between a throat and a mouth and the surface  
12 is being defined by the curves.

13 Now, that's a good question because that pretty much distinguishes  
14 this claim one over Klayman. Klayman is a section waveguide.

15 There's three sections. There's a first section which is the main  
16 section where the transducer is attached. You can refer in my brief at Figure  
17 B. The waveguide is shown in Klayman and I've defined where the sections  
18 are.

19 The first section is a mating section. The second one is a  
20 cone-shaped, driver, coupling section and the third section is a sound to  
21 intercoupling section.

22 Klayman teaches that the first two sections are conical shaped. The  
23 mating section and cone-shaped, driver coupling section are cones and  
24 they're kind of in reverse. The mating section compresses the sound and the  
25 cone-shaped, driver coupling section expands the sound according to the  
26 shape of a cone.

1           The third section is the sound intercoupling section and Klayman  
2   recites that as being exponentially shaped and also the mouth is  
3   square-shaped which provides the square mouth and the round throat  
4   section.

5           However, between each section there's a discontinuity. The  
6   cone-shaped section is defined by -- if you want to use the term control  
7   curves, it would be a linear-control curve. Then at the end of the cone  
8   section, however, there's a discontinuity that transfers to an  
9   exponentially-shaped inner surface.

10          JUDGE MARTIN: Let's talk about the discontinuity between the  
11   mating section and the cone-shaped driver section. Isn't the mating section  
12   designed to receive the transducer? Is that really part of the waveguide?  
13   How much of this do we have to consider to be the acoustic waveguide?  
14   Can we start it where the mating section meets the cone-shaped driver  
15   coupling section?

16          MR. PEREZ: Yes, you can do that.

17          JUDGE MARTIN: So, you get rid of one discontinuity?

18          MR. PEREZ: Right.

19          JUDGE MARTIN: Okay. And then we move on to the other end of  
20   the cone-shaped driver section and we get curved shaping but that seems to  
21   be a gradual transition. Do you call that a discontinuity of those two curves?

22          MR. PEREZ: It is a discontinuity specifically because of the  
23   difference in the shape, the inner surface between the two sections.

24          JUDGE MARTIN: So, even though it's a smooth transition, you're  
25   saying that's a discontinuity?

1 MR. PEREZ: Well, it's a discontinuity because it's not really a  
2 smooth transition. I mean, it may appear as such from the drawings.

3 JUDGE MARTIN: Oh, I see what you mean. You're saying we can't  
4 assume that it's rounded?

5 MR. PEREZ: Exactly.

6 JUDGE BAUMEISTER: What's your definition of discontinuity?

7 MR. PEREZ: My definition of discontinuity is based on what the  
8 specification teaches is a point or in this case a two-dimensional shape at  
9 which the inner surface is defined by a different function.

10 JUDGE BAUMEISTER: Ah, you're saying different function?

11 MR. PEREZ: That's correct.

12 JUDGE BAUMEISTER: So, it's not like you see a line of  
13 demarcation between the two surfaces. You're saying -- well, no, you  
14 couldn't see it. You're saying, if it's a different function, it's a discontinuity?

15 MR. PEREZ: Exactly. The actually being able to see the line is really  
16 not relevant.

17 JUDGE BAUMEISTER: Where is there any supporting spec for this  
18 version of --

19 MR. PEREZ: Well, first of all, it's in the claim itself. It states that the  
20 inner surface is coincident with the four curves and the four curves are each  
21 a single mathematical function, and I can tell you where in the spec that's  
22 laid out; but the four curves define the inner surface and the curves also  
23 intersect the circular throat and the non-elliptical control surface defines the  
24 mouth.

25 JUDGE MARTIN: Are you saying that the curve has to be the single  
26 function? Is that maybe what's going on here?

1 MR. PEREZ: I think that could be the source of the confusion by the  
2 Examiner and the error because basically it has to be one function.

3 JUDGE BAUMEISTER: And it could be linear?

4 MR. PEREZ: It could be linear; yes.

5 JUDGE BAUMEISTER: So, in claim two though, it says wherein the  
6 continuous three-dimensional least-energy surface is free of discontinuities.  
7 If you're defining least-energy surface as having no discontinuities, isn't  
8 claim two redundant or a doctrine of -- claim differentiation tells me there's  
9 a presumption that claim one is broader than --

10 MR. PEREZ: Well, that would be correct -- I'm sorry. Could you  
11 repeat --

12 JUDGE BAUMEISTER: You had just said your definition of  
13 least-energy surface means that the surface has to be free of discontinuities.

14 MR. PEREZ: Right.

15 JUDGE BAUMEISTER: Claim two says, "wherein" -- further limits  
16 claim one and says, "wherein the continuous three-dimensional least-energy  
17 surface is free of discontinuities."

18 MR. PEREZ: Then that would be correct. It would be duplicative  
19 and we would be deleting claim two --

20 JUDGE BAUMEISTER: In claim 13, if you want to turn to claim 13,  
21 the next-to-the-last line, the least-energy surface -- I'm sorry. Claim eight,  
22 "the continuous surface minimizing the formation of discontinuities."

23 MR. PEREZ: Well, in claim eight, I would distinguish that by -- I  
24 think there is even reference in the spec. I would distinguish that by the goal  
25 being the quality control issue.

1 To be more precise, a discontinuity is anything in the inner surface  
2 that would change the path of the wave. So, if there's a scratch or a dent or  
3 something in the surface or if it's bent in a certain way that violates the  
4 control curves then that would be discontinuity.

5 So, I would read claim eight as being more of a quality control goal.

6 JUDGE MARTIN: But if claim seven already requires that you have  
7 no discontinuities, how does minimizing something that is already not  
8 there -- how is that possible?

9 MR. PEREZ: Well, in terms of a quality control issue, it would be  
10 something that would be unintentional, a discontinuity that is unintentional.

11 JUDGE MARTIN: I'm afraid I'm getting lost here. So far we have  
12 been talking about least-energy surface and discontinuities and we also have  
13 the word "continuous" in the claims, some of the claims.

14 So, the discontinuity you're talking about is not -- we're not talking  
15 about the word "continuous?" We're talking about the term "least-energy  
16 surface?" So, it sounds like maybe we're talking about the same thing two  
17 different ways. What's the difference?

18 MR. PEREZ: The difference would be that the term "continuous"  
19 provides a means of obtaining a least-energy surface that's taught by the  
20 spec.

21 JUDGE BAUMEISTER: So, you're saying continuous -- we're really  
22 talking about one thing? Continuous and least-energy surface; it's all one.  
23 That's just one limitation. You're saying that it's free of discontinuities?

24 MR. PEREZ: That's correct.

25 JUDGE BAUMEISTER: So, it's sort of redundant?

26 MR. PEREZ: It's a little redundant.



1 JUDGE BAUMEISTER: I had interpreted continuous to mean devoid  
2 of diffraction slits like the prior art had. In the background you say, it was  
3 known to have the conical ones that were -- that you didn't get good  
4 coverage but you didn't get the sound pull away from the wall and then  
5 conversely you had the constant coverage, acoustic  
6 waveguide -- I'm sorry. Let's see.

7 Okay. So, anyway, in one you have the circular one and in the other  
8 one you had the flared one that had the flat tops and bottoms.

9 MR. PEREZ: Right.

10 JUDGE BAUMEISTER: In that one you have the diffraction slit?

11 MR. PEREZ: Right.

12 JUDGE BAUMEISTER: And your invention was to try to get one  
13 that was not this elliptical shape without having the diffraction slit?

14 MR. PEREZ: That's correct.

15 JUDGE BAUMEISTER: I thought continuous meant just continuous  
16 all the way from the mouth to the throat without any slits or openings.

17 MR. PEREZ: Well, technically, a diffraction slit would be a  
18 discontinuity; and yeah, you're correct. The goal is to use the waveguide  
19 without such diffraction slits.

20 JUDGE BAUMEISTER: That would violate both the terms in the  
21 claim language. If you had diffraction slits, it would not be continuous and  
22 also would not be a least-energy surface; right?

23 MR. PEREZ: Well, actually, the diffraction slit would violate the fact  
24 that it's a round throat.

25 JUDGE BAUMEISTER: All right. You've lost me there.

1 MR. PEREZ: Well, the idea of the throat being round is that the  
2 sound is being generated in its full -- most sound transducers are round and  
3 the entire energy is packed into the source of the waveguide. As it flares out  
4 according to the control curves, it flares out in a pattern that covers a room  
5 horizontally, and perpendicularly and vertically as desired instead of being  
6 round where a lot of energy is really wasted by going up and down and not  
7 being spread out evenly.

8 The Klayman transducer teaches that by starting out with a cone  
9 section and ending in a square mouth and if necessary they teach using a  
10 diffraction slit which basically is a section around the mouth that further  
11 directs the sound in a square pattern.

12 In waveguide number one there's no need for the diffraction slit and  
13 instead of having a conical section that drives the sound at its most powerful  
14 point, it's essentially round at the source and it's formed along the waveguide  
15 to disperse in its rectangular pattern. I don't know if that clears it up.

16 JUDGE BAUMEISTER: Well, I'm still having a problem with  
17 understanding these terms. I just don't know how broad "least-energy  
18 surface" is. I mean, what would somebody reading the spec do to inform  
19 them what the scope of that term is? There are some examples given in the  
20 spec but I don't see a definition.

21 JUDGE HAIRSTON: On page seven of the spec, you talk about  
22 mathematical equations but where are the equations?

23 MR. PEREZ: Well, they're referred to. The mathematical definitions  
24 that may be used for the control curves is convergent-divergent, control  
25 curves, rational B-line, hyperbolic curves.

1 JUDGE BAUMEISTER: The issue is when you're wrapping the  
2 surface around the four sides. In what manner can you wrap it and still be  
3 deemed to be a least-energy surface? And page seven of the spec is the only  
4 discussion I see of examples of what may be a least-energy surface. If you  
5 turn to page seven of the spec, paragraph 24.

6 MR. PEREZ: Okay.

7 JUDGE BAUMEISTER: My reading of that is, the least-energy  
8 surface may either be what is truly the least possible energy surface  
9 achievable or it's good enough that you do a modeling representation and  
10 that you're somewhere in the ballpark and that's good enough.

11 MR. PEREZ: The second approach is more accurate, I would say, as  
12 long as it's free of discontinuities.

13 JUDGE BAUMEISTER: But if you're doing just a mathematical  
14 representation or estimation, couldn't you still have discontinuities that  
15 are -- you know, it's not the very least but it's close because we can represent  
16 it with this general curve?

17 MR. PEREZ: Well, the idea is that the curve is the same kind of  
18 curve from the throat to the mouth so that you don't start off with a conical  
19 curve and switch to an elliptical curve.

20 JUDGE BAUMEISTER: Well, I know you don't want to go to the  
21 elliptical curve but I thought the whole point was anything non-elliptical.  
22 So, it could be square. It's a two- or three-dimensional curve geometry for  
23 the mouth. So, you want it to go square just as long as you don't do it with  
24 sharp corners?

25 MR. PEREZ: The whole idea is that the curve be the same curve  
26 from the throat to the mouth. In other words, it would be in a

1 two-dimensional sense because the control curves are defined as being at the  
2 opposite points on a vertical axis and horizontally axis.

3 So, the idea is that that control curve is the same from the throat to the  
4 mouth and there's no change or discontinuity between the throat and the  
5 mouth that would make it a different curve.

6 JUDGE BAUMEISTER: But that goes to the curve. You could have  
7 four continuous curves but still make these sides with a discontinuity on the  
8 corner. That wouldn't be a least-energy surface. If I take the old rectangular  
9 speaker from what we see in the MASH series that curve up and down and  
10 bottom, top, right and left -- they have corners. They're not curved; right?

11 MR. PEREZ: Well, as long as the corner is not part of the mouth.  
12 The structure Klayman has specifically -- in other words, it stops flaring at  
13 the edge of the mouth and it becomes basically a rectangular frame and that's  
14 where it disperses. In a claim waveguide, it just stops at the mouth and  
15 whatever shape comes after the mouth then that's what it's to be. I don't  
16 know if that helps.

17 JUDGE BAUMEISTER: Just a few more questions. Going back to  
18 Klayman, you said that section 12 could be treated as being separate from  
19 the waveguide. My question is, why can't section 20 similarly be treated as  
20 the mouth and only section 14, the conical section, be treated as the  
21 waveguide?

22 MR. PEREZ: That's not what Klayman teaches. Klayman teaches  
23 that you have two different sections or different sections.

24 JUDGE BAUMEISTER: Yeah; and they call it a conical section and  
25 a --

26 MR. PEREZ: Exponential.

1 JUDGE BAUMEISTER: Exponential section. Whether we call it an  
2 exponential section or exponential mouth, what's in the term? Why can't the  
3 waveguide be considered being limited to the conical section?

4 MR. PEREZ: I understand what you're saying. The idea is that the  
5 mouth is the point at which the waveguide stops; and Klayman does not  
6 teach that the waveguide stops at that interface between the cone-shape and  
7 exponential section.

8 In fact, that would be what Klayman describes in the prior art as being  
9 sufficient. The cone-shaped section is round at the -- from a front view, it's  
10 round. That would just be another cone-shaped waveguide which is the  
11 prior art that Klayman teaches is sufficient.

12 JUDGE BAUMEISTER: So, how wide can the mouth be? Is it just  
13 the edge surface? I mean the spec says it's the end. It says, the end surface.  
14 It's a three-dimensional structure; isn't it?

15 MR. PEREZ: The mouth would be -- basically, it's the point at which  
16 the waveguide stops and the sound continues into a space.

17 JUDGE BAUMEISTER: So, just the edge?

18 MR. PEREZ: That's correct.

19 JUDGE BAUMEISTER: I thought the spec said just the end. Did it  
20 define the end as the edge?

21 MR. PEREZ: I think one of ordinary skill in the art would understand  
22 that the mouth is the point at which the sound exits the waveguide and enters  
23 into the air.

24 JUDGE MARTIN: Well, pursuing that line of thought for just a  
25 second, it sounds to me like claim one says that there is a surface that  
26 defines the mouth, that these control curves intersect the surface that defines

1 the mouth. So, it seems like the surface that defines the mouth in Klayman  
2 is -- I think this is numeral 28. It's where the exponential part stops and then  
3 there's a region. The dispersion lip, is it?

4 MR. PEREZ: Yes.

5 JUDGE MARTIN: And that has an inner circle that looks like it's  
6 labeled "28" in figure 3. So, why isn't that the claim surface that defines the  
7 mouth because the claim doesn't require that the curve go all the way to the  
8 very edge. It says it just intersects the curve, the surface that defines the  
9 mouth.

10 MR. PEREZ: I understand what you're saying. However, even if you  
11 were to read it that way, the fact of the matter is, there is still a discontinuity  
12 between the exponential section and the conical section, and that's really the  
13 main distinction here.

14 JUDGE BAUMEISTER: I guess I have one last question. I see some  
15 of the independent claims say that the first control curve is symmetric. The  
16 bottom acts as a second control curve, and you're envisioning right and left,  
17 top and bottom symmetry.

18 To me, the claim doesn't preclude any radial symmetry. Is that  
19 correct? I mean, is it not possible for this claim to read on a circular throat  
20 and a circular mouth?

21 MR. PEREZ: It's not possible, no, and the reason why is that claim  
22 one states that a control curve that intersects a circular throat and a  
23 non-elliptical throat controls surface that defines the mouth.

24 JUDGE BAUMEISTER: Yes. Non-elliptical. You're saying a circle  
25 is not an ellipse?

26 MR. PEREZ: A circle is an ellipse.

1 JUDGE BAUMEISTER: Okay. Well, in your spec, you describe in  
2 the prior art how you had circular mouths and they have one phenomenon  
3 associated with it and then they also need to have elliptical ones that had the  
4 problem of pulling away from the side wall. So, I thought your spec  
5 distinguished the circle and the ellipse?

6 MR. PEREZ: Actually, the spec specifically says that a circle is an  
7 ellipse where basically the two -- I'm forgetting my geometry here. Let me  
8 find the specific citation here.

9 (Pause.)

10 MR. PEREZ: I'm sorry. I do not --

11 JUDGE BAUMEISTER: Okay. For example, page three discusses  
12 constant coverage, acoustic waveguides. These constant coverage, acoustic  
13 waveguides are the ones with the circular mouths?

14 MR. PEREZ: Right.

15 JUDGE BAUMEISTER: And then on page four it says at paragraph  
16 ten, "other approaches that realize approximate solutions for acoustic  
17 waveguides with the coverage angles," that different horizontal and vertical  
18 planes are typically formed from elliptical" -- so, it's elliptical mouth? So, to  
19 me, it sounds like an elliptical mouth is a different approach from the  
20 circular mouth.

21 MR. PEREZ: Well, the next sentence says that the elliptical shape is  
22 used for approximate solutions for wave equations because the circle is an  
23 ellipse with both the major and minor diameters equaled to the diameter of  
24 the circle.

25 JUDGE HAIRSTON: Any other questions?

26 JUDGE BAUMEISTER: No.

1 JUDGE HAIRSTON: Can I get you to sum up right quick? Anything  
2 further?

3 MR. PEREZ: Yes. Basically, Klayman does not anticipate claim one  
4 because Klayman does not teach continuous inner surface and does not teach  
5 every single limitation.

6 Thank you very much.

7 JUDGE HAIRSTON: Thank you, counsel.

8 (Whereupon, at approximately 10:37 a.m., the proceedings were  
9 concluded.)

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